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**ADP013457**

**TITLE:** Psychological Effects of Chemical and Biological [CB] Terrorism:  
Lessons from the Past

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**TITLE:** Chemical and Biological Medical Treatment Symposium - Industry  
II World Congress on Chemical and Biological Terrorism

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## **88. PSYCHOLOGICAL EFFECTS OF CHEMICAL AND BIOLOGICAL (CB) TERRORISM: LESSONS FROM THE PAST**

Gary Eifried, EAI Corporation, 1308 Continental Drive, Abingdon, Md 21009

### **ABSTRACT**

The psychological effects of CB terrorism derive from two sources; the action of the agents on the body and the brain, and the effects and implications of the terrorist act itself on the human psyche. The physical and mental effects of agent exposure are reasonably, but not completely, described in the technical literature. The psychological effects of terrorist acts in general are also reasonably well described, but only limited information is available on the specific impact of CB terrorism. Emergency response and public health systems must be prepared to handle the range of effects that can result from a terrorist incident involving a chemical or biological weapon. This paper attempts to draw from the lessons of the past to outline the types and extent of psychological effects which can be expected as a result of CB terrorism.

### **INTRODUCTION**

The psychological effects of CB terrorism stem from two sources; the action of the agents on the body and the brain, and the effects and implications of the terrorist act itself on the human psyche. The physical and mental effects of agent exposure are reasonably, but not completely, described in the technical literature. The acute psychological effects of hypoxia resulting from exposure to the pulmonary agents, feelings of anxiety and agitation from the cyanides, the central nervous system effects of the nerve agents (forgetfulness, inability to concentrate, irritability, insomnia and depression), and the mental effects of some toxins and some biological agents are well documented. This paper focuses on the effects and implications of the terrorist act itself.

### **METHODS**

A review of published studies, documents and interviews was conducted. Sources included reports prepared following the Tokyo incident, symposia proceedings, journal articles, reference books, news articles, and internet web sites.

### **RESULTS**

The psychological effects of the terrorist act can range from relatively short-term effects such as panic, disorientation, sleep disturbances, over reaction to noise and stress, to appearance of psychosomatic symptoms and Acute Stress Disorder (ASD), to longer-term reactions including Post Traumatic Stress Disorder (PTSD).

Although most people will have only mild, short-term symptoms, some individuals will develop psychiatric illness. Factors which increase psychological consequences include lack of warning, and lack of understanding of the risk. Fear of the unknown always seems to add to the impact of such an event. The presence of life threatening danger, gruesome situations, toxic material, and extended exposure to the specific danger increases the potential for psychological trauma. Extreme fatigue and intense emotional demands, such as might be experienced by emergency personnel having to make difficult rescue or triage decisions, are other indicators of high psychological potential. Symptoms of post traumatic stress range from mild to severe. At the low end of the scale are recurring anxiety, nightmares and insomnia. Extreme behaviors, such as avoiding use of the subway after the Tokyo attack or

reacting to loud sounds after witnessing a bomb explosion, can also occur and persist for long periods. Depression is often a common result among survivors, families of victims, and rescuers. These initial effects sometimes progress to more severe and debilitating symptoms, such as self-imposed isolation, substance abuse, domestic violence and suicide.

Table 1 lists two levels of psychological disorder that may occur as a reaction to trauma. Generally, the symptoms are the same. The major difference lies in the timing and duration following the trauma. Acute Stress Disorder (ASD) is a relatively short-term condition, lasting days to weeks, occurring within one month post incident. The more severe Post Traumatic Stress Disorder (PTSD) can occur any time post incident with the symptoms lasting for longer periods, possibly years. In the Tokyo Sarin incident, we can recognize these symptoms from the statements of the victims themselves. A 37-year old female who was a passenger on the Tokyo subway on 20 March 1995 was still experiencing effects in 1999. She stated in an interview, "At night, there were so many times that I would be awakened by nightmares. All of a sudden, I wouldn't be able to breathe and couldn't sleep. Now, 4½ years after the attack, I suppose I'm pretty close to being able to lead a normal life...Until AUM (ed. note: AUM Shinrikyo, the sect which carried out the terrorist act) changes, substantially, and admits its guilt, I think that I could be a victim at any time."

Toshiaki Toyota, 52, who was a station attendant on the Chiyoda line of the subway, had two friends die in the incident. He actually responded to the emergency call and picked up a Sarin-soaked newspaper. He experienced the classic symptoms of nerve agent poisoning, ultimately collapsing and remaining unconscious for 27 hours. He states, "I have no physical symptoms, but psychologically, there's this burden. I've got to get rid of it somehow." A 37-year old man who is the brother of a woman who was reduced to a nearly vegetative state by the exposure to Sarin states, "According to a nurse, she was in a "sleeping state"...Her face, to be crude, looked more dead than asleep. I could hardly bear to look at her... Since then she's had therapy and has progressed to the point where she can move her right hand. It's still not easy for her to speak...most of her memory has disappeared. They took what little joy we had."<sup>(5)</sup>

Kenji Ohashi, 47, a car dealer, was on one of the subway cars that was attacked. He experienced dimness of vision, runny nose, twitching, and shortness of breath. Hospitalized for 12 days, he continues to experience vicious headaches. He has been diagnosed with PTSD. "I feel very isolated...I've contemplated suicide. I almost think I'd be better off dead."<sup>(6)</sup> Reading the above quotes we can detect most of the symptoms of stress disorder. In 1999, the Japanese National Police Agency sent questionnaires to over 5000 victims of the Tokyo incident, of whom 1,247 responded. More than half declared that they were still suffering from physical or mental effects. Over 72% habitually use sleeping pills or alcohol to soothe their nerves. Fifty-seven percent (57%) report psychological complaints, such as fear of repeat attack flashbacks and bad dreams. In another survey of 610 victims seen at St Luke's Hospital, taken 6 months after the incident, 32% of the victims reported fear, 29% insomnia, 16% depression, 16% irritation, and 16% reported continuing nightmares (most commonly big monsters, or huge rocks falling on victims). Another 10% reported fear of using the subway system again.

Figure 1 displays the frequency of these symptoms among the victims of the Tokyo incident. Data from other disasters and traumatic situations show that both victims and rescuers are affected. Figure 2 shows the percentage of those involved who exhibit traumatic stress for a variety of incidents. Note that in the general population, emergency response personnel are at higher risk for ASD and PTSD, at about the 20% level, over their lifetime. This makes intuitive sense, because they are more often exposed to stressful and life-threatening situations. Following the Oklahoma City bombing, which certainly qualifies as a

Weapons of Mass Destruction (WMD) incident, 41% of the survivors had "diagnosable mental health conditions." Also note that 20% of the responders are thought to similarly be affected.<sup>9</sup> This confirms the depth of trauma experienced by victims and rescuers in a situation in which there is large loss of life, gruesome results, and involvement of many children. Note also that the Tokyo incident appears to be much more traumatic to victims than other incidents. Perhaps this is due to the "fear of the unknown" aspects of such an event as compared to a more familiar and common form of disaster such as earthquake, explosions and even war.

Following exposure to traumatic situations, responders often report feelings of helplessness, of not doing enough, of being overwhelmed. They suffer from seeing others suffer, and they feel under extreme pressure to "make it better." Often, these feelings are increased when they are put in the spotlight as heroes, because in their psyche, they feel they could not or did not do enough, and thus should not be considered "heroes." How many times have we read of an individual who obviously risked his life to save another, state in all honesty and humility, "I just did my job," or "I just did what anyone else would do in that situation." The end results of stress among the approximately 12,000 rescue workers in Oklahoma City have been an increased divorce rate, domestic violence, resignations and alcohol use. Among those involved in the rescue and prosecution, there have been 6 suicides. In addition, among local firefighters and their families, there have been 30 interventions that successfully prevented a threatened suicide. Interestingly, of the first 10 rescue dog handlers on scene (50 ultimately responded), 70% have resigned from the service.

## CONCLUSIONS

Response planning for incidents of terrorism involving WMD will have to include more than just the initial rescue and treatment of personnel and the restoration of the site to normal operations. The immediate and longer-term effects of the trauma among victims, their families and rescue personnel must be expected and accounted for in the response plan. Initial interventions should focus on decreasing those factors that are known to increase the psychological consequences of an event. Making the situation safe as quickly as possible, providing rest and relief for responders and providing stress intervention debriefings will help. High-risk groups, especially those exposed to the most gruesome aspects of the disaster, need to be identified for help. Researchers have found that those exhibiting avoidance and numbing symptoms are most predictive of PTSD. Active outreach programs for victims and responders and their families should be established.

As action at the scene decreases, there will be time for the initiation of later interventions. Incident stress debriefings for high-risk groups should continue. The media can help resolve the "fear of the unknown" among the populace, victims and responders by publishing factual, non-exploitative information. This implies that the response community must be prepared to assist the media by providing accurate information and guidance in as timely a manner as possible. Arranging and conducting memorial services gives individuals the opportunity to grieve, to recognize the extent of community support available, to recognize that they are not alone in their feelings about the event, and to begin to bring closure to the tragedy. Government support, including mental health services, restitution for victims, and successful prosecution of the perpetrators all assist in decreasing the psychological trauma. Finally, provision must be made for long-term psychological treatment of the most difficult cases.

## SUMMARY

CB terrorism has a high potential to cause psychological stress in victims and

responders, with both acute and chronic impact. Consideration of actions and integration of personnel to assist in mitigating and relieving this stress must be included in the response and recovery plan. Incident stress debriefings and other mental health interventions will be a critical aspect of the immediate and long-term response to such incidents.

**Table 1: Degrees of Reaction to Trauma**

Symptom	Acute Stress Disorder	Post Traumatic Stress Disorder
Re-experiencing trauma	X	X
Avoidance of reminders	X	X
Hyperarousal	X	X
Dissociation	X	X
Significant distress or impairment	X	X
Onset of symptoms	Within 1 month of trauma	Anytime following trauma
Duration of symptoms	2 days to 4 weeks	> 1 month

**From Diagnostic and Statistical Manual of Mental disorders, Fourth Edition (DSM-IV)**

**Figure 1: Frequency of Psychological Symptoms Following the Tokyo Incident**

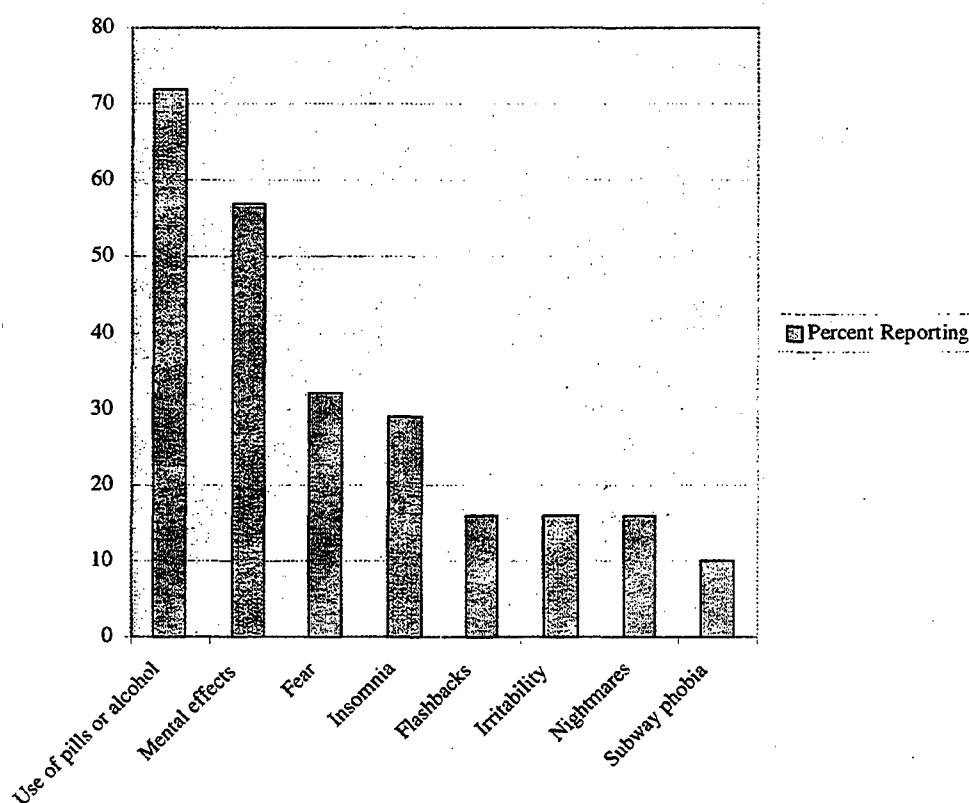
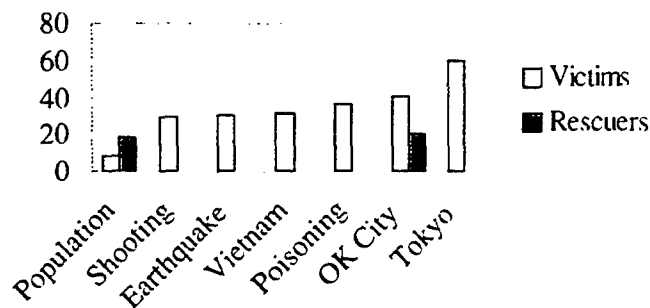


Figure 2: Traumatic Stress from a Variety of Incidents



#### REFERENCES

1. Bellamy, Ronald F., MD. editor, *Textbook of Military Medicine, Medical Aspects of Chemical and Biological Warfare*, Office of the Surgeon General, Department of the Army, Washington, DC, 1997.
2. Flynn, Brian W., Ed.D., *Psychological Aspects of Terrorism*, presented at the First Harvard Symposium on the Medical Consequences of Terrorism, Boston, Massachusetts, 24-25 April 1996.
3. Interview published in *Mainichi Shimbun*, 1 October 1999.
4. Haruki Murakami, *South China Morning Post*, 9 June 2000.
5. Ibid
6. Ibid
7. Sasaki, Masahito, personal correspondence, 1999
8. Ohbu, Sadayoshi, MD et al, *Sarin Poisoning on Tokyo Subway*, *Southern Medical Journal*, at [www.sma.org](http://www.sma.org), 3 June 1997.
9. Ursano, Robert J. MD, et al, *Psychiatric Dimensions of Disaster: Patient Care, Community Consultation, and Preventive Medicine*, American Psychiatric Association, Practice of Psychiatry, at [www.psych.org](http://www.psych.org), 2001.
10. Jones, John G., Ph.D., *Mental Health Intervention in the Aftermath of a Mass Casualty Disaster*, at [www.fsu.edu/~trauma](http://www.fsu.edu/~trauma), 2001.
11. North, Carol, M.D., *Psychiatric Disorders Among Survivors of the Oklahoma City Bombing*, *Journal of the American Medical Association*, 25 August 1999.